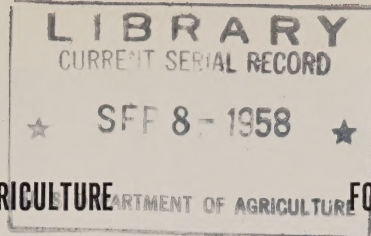


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Needle Cast of Southern Pines

By John S. Boyce, Jr., forest pathologist, Southeastern Forest
Experiment Station

"Needle cast" is the collective name given to diseases caused by several fungi that result in dieback of pine needles often followed by premature shedding or "casting." The causal fungi are always confined to the needles, but trees of any size may be infected. Needle cast is more abundant in some years than in others, depending upon predisposing weather conditions, chiefly precipitation. Needle cast of southern pines is usually not economically important, because trees periodically attacked almost always recover between attacks and the effects on growth appear to be slight. Diseased trees frequently occur intermingled with healthy ones of the same species. Needle diseases caused by rust fungi and the brown-spot disease as it affects longleaf pine are not discussed in this leaflet.

Hosts

Eastern white, loblolly, longleaf, pitch, pond, shortleaf, slash, Table-Mountain, and Virginia pines are subject to infection by one or more fungi that cause needle blights or needle casts.

Symptoms

Affected trees have a scorched appearance because the infected needles usually turn brown from the tip toward the base. The partly dead needles are either shed earlier than is normal or, if they remain at-

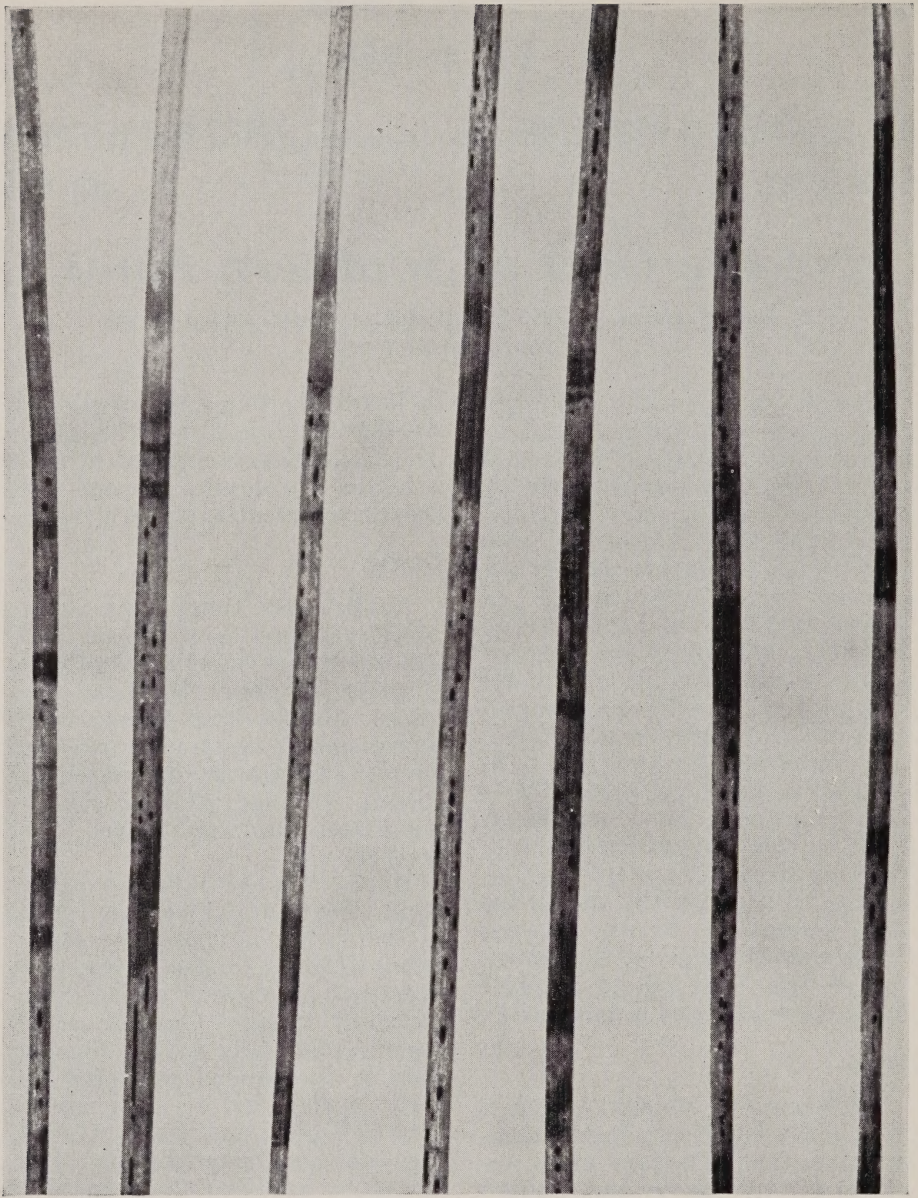
tached to the twigs, the needle tips weather and break off. The foliage of infected pines sometimes presents a tufted appearance because only the current needles remain attached.

Cause

Needle cast fungi have small, black, elongate to elliptical, fruiting bodies known as hysterothecia. They are best seen with a hand magnifier. Mature hysterothecia open during moist weather by means of a central lengthwise slit to discharge spores. The spores are carried by wind and rain, and infect other needles.

Much of the needle browning that is prevalent on southern hard pines in the spring is caused by *Hypoderma lethale*; longleaf pine, however, does not appear to be susceptible to this fungus. Current needles are infected early in the summer. Late in the following winter and early spring before new needle growth begins, the infected needles turn brown starting from their tips. The dying needle or needle tip has a mottled appearance because the tissue at the scattered points of infection dies first (fig. 1). Needles in various stages of dieback are often shed prematurely. The fruiting bodies of *H. lethale* are shining black and narrow (fig. 2, 4).

The habits of a similar fungus, *Hypoderma hedgcockii*, are strikingly different in that the hysterothecia occur on green needles which



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FIGURE 1.—Needles of slash pine infected by *Hypoderma lethale*. Notice the mottled appearance and the fungus hysterothecia in the zones of infection.

turn yellowish throughout their lengths and are shed prematurely. Southern hard pines, especially slash, are attacked, but this disease is much less commonly observed than the needle dieback caused by *H. lethale*. *H. hedgcockii* fruiting

bodies are shining black and elliptical.

Lophodermium pinastri is commonly found on dead needles and dead tips of living needles of all pine species growing in the South. For the most part it is saprophytic,

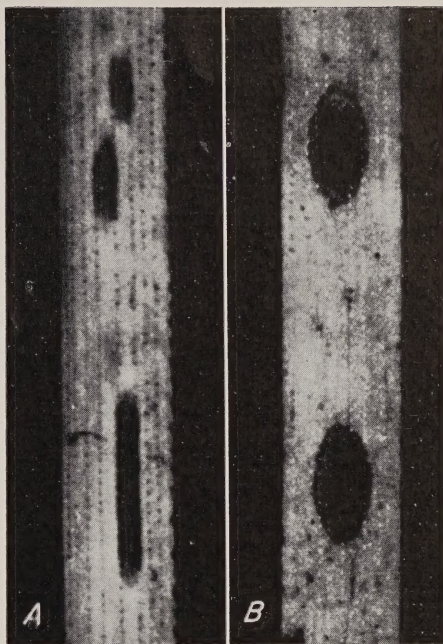
that is, it lives on dead plant material. Its hysterothecia are black and elliptical (fig. 2, B).

Bifusella linearis attacks only eastern white pine. Commonly only the 2- and 3-year-old needles—seldom those of the current season—exhibit symptoms. This fungus causes needle dieback and defoliation, but the effects are usually confined to seedlings and saplings and the lower crowns of larger trees. The black fruiting bodies vary in length up to one-fourth inch or more. They in turn are embedded in a very conspicuous black crusty material that may extend the length of the needle.

Scirrhia acicola, which causes the well-known brown-spot disease on needles of longleaf pine seedlings, also attacks the foliage of loblolly pines of all sizes, causing needle dieback. Strictly speaking, *S. acicola* is not one of the needle cast fungi. It is included here because of the similarity of needles infected by it to those infected by *Hypoderma lethale* in the early stages of dieback. There is one important difference, however. Current needles infected by *S. acicola* may die back in the fall and early winter as well as in the spring, whereas needles infected by *H. lethale* first show tip browning in late winter and early spring. It is not uncommon to find infections by both fungi on the same loblolly pine. The gray fruiting bodies of *S. acicola* open by lengthwise slits at the edges to discharge spores, rather than by a well-defined central slit as is typical of the true needle cast fungi.

Damage

The amount of foliage dieback caused by needle cast fungi varies from year to year on individual



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FIGURE 2.—Fungus fruiting on pine needles: A, Hysterothecia of *Hypoderma lethale*; B, Hysterothecia of *Lophodermium pinastri*.

trees. Although tree mortality directly attributable to these needle fungi has not been observed, it is probable that some reduction in rate of growth results from severe attacks, particularly in the case of seedlings and smaller trees; and heavy attacks could predispose trees to bark beetle attack.

Control

Practical control measures have not been devised for forest stands. Usually they are not necessary. Infections by *Hypoderma lethale* can be reduced by applying ferbam (2 pounds per 100 gallons of water) or Puratized¹ agricultural spray (1 pint per 100 gallons of water). Application should first be made when the needles begin to emerge, and

¹ The use of a brand name by the Department is for the convenience of the reader and implies no approval of the product to the exclusion of others which may also be suitable.

should be continued at 2-week intervals until the end of June.

Brown spot on longleaf pine can be prevented by spraying with 4-4-50 bordeaux mixture or ferbam (2 pounds per 100 gallons of water) at monthly intervals beginning when the needles emerge and continuing until the end of September. It is likely that such sprays will also control brown spot on loblolly pine.

CAUTION: Bordeaux mixture, ferbam, and Puratized agricultural spray are mild poisons. In handling them, follow the directions and heed the precautions given by the manufacturer.

References

- FOREST PATHOLOGY. JOHN SHAW BOYCE. Ed. 2, 550 pp., illus. New York. 1948.
- LOPHODERMIIUM PINASTRI AND NEEDLE BROWNING OF SOUTHERN PINES. JOHN S. BOYCE, JR. Jour. Forestry 49: 20-24. 1951.
- A NEEDLE BLIGHT OF LOBLOLLY PINE CAUSED BY THE BROWN-SPOT FUNGUS. JOHN S. BOYCE, JR. Jour. Forestry 50: 686-687. 1952.
- HYPODERMA NEEDLE BLIGHT OF SOUTHERN PINES. JOHN S. BOYCE, JR. Jour. Forestry 52: 496-498. 1954.
- THE HYPODERMATACEAE OF CONIFERS. GRANT DOOKS DARKER. Arnold Arboretum Contrib. I, 131 pp., illus. 1932.
- CHEMICAL CONTROL OF HYPODERMA LETHALE ON PITCH PINE. C. L. MORRIS. Plant Dis. Rptr. 37: 368-370. 1953.

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